

***What Is Claimed Is:***

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1. A method for selectively increasing the amount of at least one metal recovered from metal-containing soil comprising:
    - (a) elevating the pH of the soil; and
    - (b) cultivating at least one metal-hyperaccumulator plant in the soil under conditions sufficient to permit said at least one plant to accumulate said at least one metal from the soil in above-ground tissue.
  2. The method of claim 1, wherein said at least one metal is nickel.
  3. The method of claim 1, wherein the pH of the soil is elevated by adding to the soil at least one agent that results in an increase in the soil pH.
  4. The method of claim 3, wherein the at least one agent that results in an increase in the soil pH is selected from the group consisting of limestone, dolomitic limestone, lime, hydrated lime, limestone equivalents and mixtures thereof.
  5. The method of claim 1, further comprising after said cultivating:
    - (c) lowering the pH of the soil; and
    - (d) cultivating the at least one metal-hyperaccumulator plant in the soil under conditions sufficient to permit said at least one plant to accumulate at least one second metal from the soil in above-ground tissue.
  6. The method of claim 5, wherein the at least one second metal is selected from the group consisting of: cobalt, palladium, rhodium, ruthenium, platinum, iridium, osmium, rhenium and mixtures thereof.

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7. ~~The method of claim 5, wherein the pH of the soil is lowered by adding to the soil at least one agent that results in a decrease of the soil pH.~~
8. The method of claim 1, wherein said at least one plant is an *Alyssum* plant.
9. ~~The method of claim 8, wherein said *Alyssum* plant is selected from the group consisting of: *A. murale*, *A. pintodasilvae*, *A. serpyllifolium*, *A. malactanum*, *A. lesbiacum*, *A. fallacinum*, *A. argenteum*, *A. bertolonii*, *A. tenium*, *A. heldreichii*, *A. corsicum*, *A. pterocarpum*, *A. caricum* and mixtures thereof.~~
10. ~~A method for recovering nickel from nickel-containing soil comprising:~~  
~~(a) elevating the pH of the soil;~~  
~~(b) cultivating at least one nickel-hyperaccumulator plant in the soil under conditions such that at least 0.1% of the above-ground tissue of said at least one plant, on a dry weight basis, is nickel;~~  
~~(c) harvesting said at least one plant; and~~  
~~(d) recovering nickel from said harvested plant.~~
11. The method of claim 10, wherein the soil has a calcium concentration of between about 20-80%.
12. The method of claim 10, wherein the nickel is recovered by drying and combusting the harvested plant to oxidize and vaporize organic material present.
13. The method of claim 10, wherein said at least one plant is an *Alyssum* plant.

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14. The method of claim 13, wherein said *Alyssum* plant is selected from the group consisting of: *A. murale*, *A. pintodasilvae*, *A. serpyllifolium*, *A. malacitanum*, *A. lesbiacum*, *A. fallacinum*, *A. argenteum*, *A. bertolonii*, *A. tenium*, *A. heldreichii*, *A. corsicum*, *A. pterocarpum*, *A. caricum* and mixtures thereof.

15. The method of claim 14, wherein said *Alyssum* plant is selected from the group consisting of: *A. corsicum* G16, *A. murale* G69, *A. murale* G82 and mixtures thereof.

16. The method of claim 10, wherein at least about 2.5% of the above-ground tissue of said at least one plant, on a dry weight basis, is nickel.

17. The method of claim 16, wherein at least about 3.0% of the above-ground tissue of said at least one plant, on a dry weight basis, is nickel.

18. The method of claim 17, wherein about 4.0% of the above-ground tissue of said at least one plant, on a dry weight basis, is nickel.

19. A method for recovering cobalt from cobalt-containing soil comprising:  
(a) lowering the pH of the soil;  
(b) cultivating at least one cobalt-hyperaccumulator plant in the soil under conditions such that at least 0.1% of the above-ground tissue of said at least one plant, on a dry weight basis, is cobalt;  
(c) harvesting said at least one plant; and  
(d) recovering cobalt from said harvested plant.

20. The method of claim 19, wherein the soil has a calcium concentration of between about 20-80%.

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21. The method of claim 20, wherein said at least one plant is an *Alyssum* plant.
22. The method of claim 21, wherein said *Alyssum* plant is selected from the group consisting of: *A. murale*, *A. pintodasilvae*, *A. serpyllifolium*, *A. malacitanum*, *A. lesbiacum*, *A. fallacinum*, *A. argenteum*, *A. bertolonii*, *A. tenuum*, *A. heldreichii*, *A. corsicum*, *A. pterocarpum*, *A. caricum* and mixtures thereof.
23. An isolated *Alyssum* plant species that accumulates nickel in quantities greater than that accumulated by *A. murale* 103.
24. An isolated *Alyssum* plant species cultivated on nickel-containing soil that accumulates nickel in above-ground tissue at a concentration of 1.55% or greater by weight based on the gross dry weight of said tissue.
25. The isolated *Alyssum* plant species of claim 23 or 24, wherein the species is *A. corsicum* G16.
26. The isolated *Alyssum* plant species of claim 23 or 24, wherein the species is *A. murale* G69.
27. The isolated *Alyssum* plant species of claim 23 or 24, wherein the species is *A. murale* G82.
28. Pollen of the plant of claim 23 or 24.
29. A plant having all the physiological and morphological characteristics of the plant of claim 23 or 24.

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30. Propagation material of the plant of claim 23 or 24.
31. An *Alyssum corsicum* G16 seed as deposited with the American Type Culture Collection under accession number 203436.
32. An *Alyssum murale* G69 seed as deposited with the American Type Culture Collection under accession number 203437.
33. An *Alyssum murale* G82 seed as deposited with the American Type Culture Collection under accession number 203438.
34. A plant produced by growing the seed of any one of claims 31-33.
35. Pollen of the plant of claim 34.
36. A plant having all the physiological and morphological characteristics of the plant of claim 34.
37. Propagation material of the plant of claim 34.
38. A method for decontaminating metal-containing soil, comprising cultivating at least one hyperaccumulator plant in metal-containing soil, whereby the concentration of metal in the above-ground plant tissue of said at least one hyperaccumulator plant exceeds the concentration of metal in said soil by a factor of at least 2.
39. The method of claim 38, wherein the at least one hyperaccumulator plant exceeds the concentration of metal in said soil by a factor of 3.

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40. The method of claim 39, wherein the at least one hyperaccumulator plant exceeds the concentration of metal in said soil by a factor of 4.

41. A method for selectively increasing the amount of at least one metal recovered from metal-containing soil comprising:

- (a) lowering the pH of the soil; and
- (b) cultivating at least one metal-hyperaccumulator plant in the soil under conditions sufficient to permit said at least one plant to accumulate said at least one metal from the soil in above-ground tissue.

42. The method of claim 41, wherein said at least one metal is selected from the group consisting of: cobalt, palladium, rhodium, ruthenium, platinum, iridium, osmium, rhenium and mixtures thereof.

43. The method of claim 41, wherein the pH of the soil is lowered by adding to the soil at least one agent that results in a decrease of the soil pH.

44. The method of claim 41, further comprising after said cultivating:

- (c) raising the pH of the soil; and
- (d) cultivating the at least one metal-hyperaccumulator plant in the soil under conditions sufficient to permit said at least one plant to accumulate at least one second metal from the soil in above-ground tissue.

45. The method of claim 44, wherein the pH of the soil is elevated by adding to the soil at least one agent that results in an increase in the soil pH.

46. The method of claim 45, wherein the at least one agent that results in an increase in the soil pH is selected from the group consisting of limestone, dolomitic limestone, lime, hydrated lime, limestone equivalents and mixtures thereof.

47. The method of claim 44, wherein the at least one second metal is nickel.

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